SEQUENCE LISTING

<110>   Covacci, Antonio
        Bugnoli, Massimo
        Telford, John
        Macchia, Giovanni
        Rappuoli, Rino

<120>   HELICOBACTER PYLORI CAI ANTIGEN POLYNUCLEOTIDES

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<150>   US 08/471,491
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gacagacact aacgaaaggc tttgttcttt aaagtctgca tggatatttc ctaccccaaa     4380

aagacttaac cctttgctta aaattaagtt tgattgtgct agtgggttcg tgctatagtg     4440

cgaaaattaa ttaagggtta taaagagagc ataaactaga aaaaacaagt agctataaca     4500

aagatcaagt tcaaaaaatc atagagcttt tagagcaaat tgatcgcgct cttaaccaaa     4560

gaaaaatcag aaaaaccata ggaattatca caccttataa tgcccaaaaa agacgcttgc     4620

gatcagaagt ggaaaaatac ggcttcaaga attttgatga gctcaaaata gacactgtgg     4680

atgcctttca aggtgaagag gcagatatta ttatttattc caccgtgaaa acttgtggta     4740

atctttcttt cttgctagat tctaaacgct tgaatgtggc tatttctagg gcaaaagaaa     4800

atctcatttt tgtgggtaaa aagtcttttct ttgagaattt atgaagcgat gagaagaata     4860

tctttagcgc tattttgcaa gtctgtagat aggtaatctt ttccaaagat aatcattaga     4920

cattcttcgc ttcaaaacgc tttcataaat ctctctaaag cgctttataa tcaacacaat     4980

acccttatag tgtgagctat agccccttt tgggaattga gttattttga ctttaaattt     5040

ttattagcgt tacaatttga gccattcttt agcttgtttt tctagccaga tcacatcgcc     5100
                                    Page 11
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gctcgcatga aattccactt tagggaatgc gtgtgcattt tttttaaggg cgtattttg   5160

ctgcaaatat cctacaatag catcgcccga atggatgagt agggggggtg ttgaaagggc   5220

aaaatgctcc ataaaatagc cctcaatttt ttgagcgatt aagggaaaat gcgtgcaacc   5280

taaataatc acttcgggaa aatctttaag ggagtgaaat aataacgcat gcaagtttct   5340

aacaattcgc cctctaaaat actttcttca atcaaaggca caaaagaga agtggctaaa   5400

tgcgaaacat tcaaatagcc ttgttgtttc agggcattgt cataagcgtt ggattggatc   5460

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tctaaagcta gagcgctcgc tgtgttgcat gccacaatca ataattcaat ctggtgcggt   5640

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taaggcactc tagccgtatc gccataatag atgatttcat caaataattg cgcttttaaa   5760

aggcttttta aaacgctaaa ccctcccaca ccgctatcaa aaacgcctat tttcatgaca   5820

cttttttaat ttaatgggat taattagggga ttttattttt cattcattaa gtttaaaat   5880

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<211> 1147
<212> PRT
<213> Helicobacter pylori

<400> 5

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1   5   10   15

Asn Pro Gln Gln Phe Ile Asn Asn Leu Gln Val Ala Phe Leu Lys Val
            20   25   30

Asp Asn Ala Val Ala Ser Tyr Asp Pro Asp Gln Lys Pro Ile Val Asp
        35   40   45

Lys Asn Asp Arg Asp Asn Arg Gln Ala Phe Glu Gly Ile Ser Gln Leu
    50   55   60

Arg Glu Glu Tyr Ser Asn Lys Ala Ile Lys Asn Pro Thr Lys Lys Asn
65   70   75   80

Gln Tyr Phe Ser Asp Phe Ile Asn Lys Ser Asn Asp Leu Ile Asn Lys
                85   90   95

Asp Asn Leu Ile Asp Val Glu Ser Ser Thr Lys Ser Pro Gln Lys Phe
            100   105   110

Gly Asp Gln Arg Tyr Arg Ile Phe Thr Ser Trp Val Ser His Gln Asn
      115   120   125

Asp Pro Ser Lys Ile Asn Thr Arg Ser Ile Arg Asn Phe Met Glu Asn
      130   135   140

Ile Ile Gln Pro Pro Ile Leu Asp Asp Lys Glu Lys Ala Glu Phe Leu
145   150   155   160

Lys Ser Ala Lys Gln Ser Phe Ala Gly Ile Ile Ile Gly Asn Gln Ile
          165   170   175

Arg Thr Asp Gln Lys Phe Met Gly Val Phe Asp Glu Ser Leu Lys Glu
      180   185   190

Arg Gln Glu Ala Glu Lys Asn Gly Glu Pro Thr Gly Gly Asp Trp Leu
      195   200   205

Asp Ile Phe Leu Ser Phe Ile Phe Asp Lys Lys Gln Ser Ser Asp Val
      210   215   220

Lys Glu Ala Ile Asn Gln Glu Pro Val Pro His Val Gln Pro Asp Ile
225   230   235   240

Ala Thr Thr Thr Thr Asp Ile Gln Gly Leu Pro Pro Glu Ala Arg Asp
          245   250   255

Leu Leu Asp Glu Arg Gly Asn Phe Ser Lys Phe Thr Leu Gly Asp Met
      260   265   270

Glu Met Leu Asp Val Glu Gly Val Ala Asp Ile Asp Pro Asn Tyr Lys
      275   280   285

Phe Asn Gln Leu Leu Ile His Asn Asn Ala Leu Ser Ser Val Leu Met
      290   295   300

Gly Ser His Asn Gly Ile Glu Pro Glu Lys Val Ser Leu Leu Tyr Gly
305   310   315   320

Gly Asn Gly Gly Pro Gly Ala Arg His Asp Trp Asn Ala Thr Val Gly
          325   330   335

Tyr Lys Asp Gln Gln Gly Asn Asn Val Ala Thr Ile Ile Asn Val His
      340   345   350

Met Lys Asn Gly Ser Gly Leu Val Ile Ala Gly Gly Glu Lys Gly Ile

                355   360   365

Asn Asn Pro Ser Phe Tyr Leu Tyr Lys Glu Asp Gln Leu Thr Gly Ser
    370   375   380

Gln Arg Ala Leu Ser Gln Glu Glu Ile Gln Asn Lys Ile Asp Phe Met
385   390   395   400

Glu Phe Leu Ala Gln Asn Asn Ala Lys Leu Asp Asn Leu Ser Glu Lys
                405   410   415

Glu Lys Glu Lys Phe Arg Thr Glu Ile Lys Asp Phe Gln Lys Asp Ser
            420   425   430

Lys Ala Tyr Leu Asp Ala Leu Gly Asn Asp Arg Ile Ala Phe Val Ser
            435   440   445

Lys Lys Asp Thr Lys His Ser Ala Leu Ile Thr Glu Phe Gly Asn Gly
    450   455   460

Asp Leu Ser Tyr Thr Leu Lys Asp Tyr Gly Lys Lys Ala Asp Lys Ala
465   470   475   480

Leu Asp Arg Glu Lys Asn Val Thr Leu Gln Gly Ser Leu Lys His Asp
                485   490   495

Gly Val Met Phe Val Asp Tyr Ser Asn Phe Lys Tyr Thr Asn Ala Ser
                500   505   510

Lys Asn Pro Asn Lys Gly Val Gly Val Thr Asn Gly Val Ser His Leu
            515   520   525

Glu Val Gly Phe Asn Lys Val Ala Ile Phe Asn Leu Pro Asp Leu Asn
    530   535   540

Asn Leu Ala Ile Thr Ser Phe Val Arg Arg Asn Leu Glu Asp Lys Leu
545   550   555   560

Thr Thr Lys Gly Leu Ser Pro Gln Glu Ala Asn Lys Leu Ile Lys Asp
                565   570   575

Phe Leu Ser Ser Asn Lys Glu Leu Val Gly Lys Thr Leu Asn Phe Asn
                580   585   590

Lys Ala Val Ala Asp Ala Lys Asn Thr Gly Asn Tyr Asp Glu Val Lys
            595   600   605

Lys Ala Gln Lys Asp Leu Glu Lys Ser Leu Arg Lys Arg Glu His Leu
    610   615   620

Glu Lys Glu Val Glu Lys Lys Leu Glu Ser Lys Ser Gly Asn Lys Asn
625   630   635   640

Lys Met Glu Ala Lys Ala Gln Ala Asn Ser Gln Lys Asp Glu Ile Phe
            645   650   655

Ala Leu Ile Asn Lys Glu Ala Asn Arg Asp Ala Arg Ala Ile Ala Tyr
            660   665   670

Ala Gln Asn Leu Lys Gly Ile Lys Arg Glu Leu Ser Asp Lys Leu Glu
            675   680   685

Asn Val Asn Lys Asn Leu Lys Asp Phe Asp Lys Ser Phe Asp Glu Phe
    690   695   700

Lys Asn Gly Lys Asn Lys Asp Phe Ser Lys Ala Glu Glu Thr Leu Lys
705   710   715   720

Ala Leu Lys Gly Ser Val Lys Asp Leu Gly Ile Asn Pro Glu Trp Ile
            725   730   735

Ser Lys Val Glu Asn Leu Asn Ala Ala Leu Asn Glu Phe Lys Asn Gly
            740   745   750

Lys Asn Lys Asp Phe Ser Lys Val Thr Gln Ala Lys Ser Asp Leu Glu
            755   760   765

Asn Ser Val Lys Asp Val Ile Ile Asn Gln Lys Val Thr Asp Lys Val
    770   775   780

Asp Asn Leu Asn Gln Ala Val Ser Val Ala Lys Ala Thr Gly Asp Phe
785   790   795   800

Ser Arg Val Glu Gln Ala Leu Ala Asp Leu Lys Asn Phe Ser Lys Glu
            805   810   815

Gln Leu Ala Gln Gln Ala Gln Lys Asn Glu Ser Leu Asn Ala Arg Lys
            820   825   830

Lys Ser Glu Ile Tyr Gln Ser Val Lys Asn Gly Val Asn Gly Thr Leu
            835   840   845

Val Gly Asn Gly Leu Ser Gln Ala Glu Ala Thr Thr Leu Ser Lys Asn
    850   855   860

Phe Ser Asp Ile Lys Lys Glu Leu Asn Ala Lys Leu Gly Asn Phe Asn
865   870   875   880

Asn Asn Asn Asn Asn Gly Leu Lys Asn Glu Pro Ile Tyr Ala Lys Val
                885   890   895

Asn Lys Lys Lys Ala Gly Gln Ala Ala Ser Leu Glu Glu Pro Ile Tyr
                900   905   910

Ala Gln Val Ala Lys Lys Val Asn Ala Lys Ile Asp Arg Leu Asn Gln
          915   920   925

Ile Ala Ser Gly Leu Gly Val Val Gly Gln Ala Ala Gly Phe Pro Leu
      930   935   940

Lys Arg His Asp Lys Val Asp Asp Leu Ser Lys Val Gly Leu Ser Arg
945   950   955   960

Asn Gln Glu Leu Ala Gln Lys Ile Asp Asn Leu Asn Gln Ala Val Ser
                965   970   975

Glu Ala Lys Ala Gly Phe Phe Gly Asn Leu Glu Gln Thr Ile Asp Lys
                980   985   990

Leu Lys Asp Ser Thr Lys His Asn Pro Met Asn Leu Trp Val Glu Ser
          995   1000   1005

Ala Lys Lys Val Pro Ala Ser Leu Ser Ala Lys Leu Asp Asn Tyr
      1010   1015   1020

Ala Thr Asn Ser His Ile Arg Ile Asn Ser Asn Ile Lys Asn Gly
      1025   1030   1035

Ala Ile Asn Glu Lys Ala Thr Gly Met Leu Thr Gln Lys Asn Pro
      1040   1045   1050

Glu Trp Leu Lys Leu Val Asn Asp Lys Ile Val Ala His Asn Val
      1055   1060   1065

Gly Ser Val Pro Leu Ser Glu Tyr Asp Lys Ile Gly Phe Asn Gln
      1070   1075   1080

Lys Asn Met Lys Asp Tyr Ser Asp Ser Phe Lys Phe Ser Thr Lys
      1085   1090   1095

Leu Asn Asn Ala Val Lys Asp Thr Asn Ser Gly Phe Thr Gln Phe
      1100   1105   1110

```
Leu Thr  Asn Ala Phe Ser Thr  Ala Ser Tyr Tyr Cys  Leu Ala Arg
    1115                1120                1125
```

```
Glu Asn  Ala Glu His Gly Ile  Lys Asn Val Asn Thr  Lys Gly Gly
    1130                1135                1140
```

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Phe Gln  Lys Ser
    1145
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<210>  6
<211>  546
<212>  PRT
<213>  Helicobacter pylori
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<400>  6
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Met Ala Lys Glu Ile Lys Phe Ser Asp Ser Ala Arg Asn Leu Leu Phe
1               5                   10                  15
```

```
Glu Gly Val Arg Gln Leu His Asp Ala Val Lys Val Thr Met Gly Pro
            20                  25                  30
```

```
Arg Gly Arg Asn Val Leu Ile Gln Lys Ser Tyr Gly Ala Pro Ser Ile
        35                  40                  45
```

```
Thr Lys Asp Gly Val Ser Val Ala Lys Glu Ile Glu Leu Ser Cys Pro
    50                  55                  60
```

```
Val Ala Asn Met Gly Ala Gln Leu Val Lys Glu Val Ala Ser Lys Thr
65                  70                  75                  80
```

```
Ala Asp Ala Ala Gly Asp Gly Thr Thr Thr Ala Thr Val Leu Ala Tyr
                85                  90                  95
```

```
Ser Ile Phe Lys Glu Gly Leu Arg Asn Ile Thr Ala Gly Ala Asn Pro
            100                 105                 110
```

```
Ile Glu Val Lys Arg Gly Met Asp Lys Ala Ala Glu Ala Ile Ile Asn
        115                 120                 125
```

```
Glu Leu Lys Lys Ala Ser Lys Lys Val Gly Gly Lys Glu Glu Ile Thr
    130                 135                 140
```

```
Gln Val Ala Thr Ile Ser Ala Asn Ser Asp His Asn Ile Gly Lys Leu
145                 150                 155                 160
```

```
Ile Ala Asp Ala Met Glu Lys Val Gly Lys Asp Gly Val Ile Thr Val
                165                 170                 175
```

Glu Glu Ala Lys Gly Ile Glu Asp Glu Leu Asp Val Val Glu Gly Met
          180   185   190

Gln Phe Asp Arg Gly Tyr Leu Ser Pro Tyr Phe Val Thr Asn Ala Glu
          195   200   205

Lys Met Thr Ala Gln Leu Asp Asn Ala Tyr Ile Leu Leu Thr Asp Lys
   210   215   220

Lys Ile Ser Ser Met Lys Asp Ile Leu Pro Leu Leu Glu Lys Thr Met
225   230   235   240

Lys Glu Gly Lys Pro Leu Leu Ile Ile Ala Glu Asp Ile Glu Gly Glu
          245   250   255

Ala Leu Thr Thr Leu Val Val Asn Lys Leu Arg Gly Val Leu Asn Ile
          260   265   270

Ala Ala Val Lys Ala Pro Gly Phe Gly Asp Arg Arg Lys Glu Met Leu
          275   280   285

Lys Asp Ile Ala Ile Leu Thr Gly Gly Gln Val Ile Ser Glu Glu Leu
   290   295   300

Gly Leu Ser Leu Glu Asn Ala Glu Val Glu Phe Leu Gly Lys Ala Gly
305   310   315   320

Arg Ile Val Ile Asp Lys Asp Asn Thr Thr Ile Val Asp Gly Lys Gly
          325   330   335

His Ser Asp Asp Val Lys Asp Arg Val Ala Gln Ile Lys Thr Gln Ile
          340   345   350

Ala Ser Thr Thr Ser Asp Tyr Asp Lys Glu Lys Leu Gln Glu Arg Leu
          355   360   365

Ala Lys Leu Ser Gly Gly Val Ala Val Ile Lys Val Gly Ala Ala Ser
   370   375   380

Glu Val Glu Met Lys Glu Lys Lys Asp Arg Val Asp Asp Ala Leu Ser
385   390   395   400

Ala Thr Lys Ala Ala Val Glu Glu Gly Ile Val Ile Gly Gly Gly Ala
          405   410   415

Ala Leu Ile Arg Ala Ala Gln Lys Val His Leu Asn Leu His Asp Asp

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              420              425                    430
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Glu Lys Val Gly Tyr Glu Ile Ile Met Arg Ala Ile Lys Ala Pro Leu
        435   440   445

Ala Gln Ile Ala Ile Asn Ala Gly Tyr Asp Gly Val Val Val Asn
    450   455   460

Glu Val Glu Lys His Glu Gly His Phe Gly Phe Asn Ala Ser Asn Gly
465   470   475   480

Lys Tyr Val Asp Met Phe Lys Glu Gly Ile Ile Asp Pro Leu Lys Val
                  485   490   495

Glu Arg Ile Ala Leu Gln Asn Ala Val Ser Val Ser Ser Leu Leu Leu
        500   505   510

Thr Thr Glu Ala Thr Val His Glu Ile Lys Glu Glu Lys Ala Thr Pro
        515   520   525

Ala Met Pro Asp Met Gly Gly Met Gly Gly Met Gly Gly Met Gly Gly
    530   535   540

Met Met
545

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<211>  1838
<212>  DNA
<213>  Helicobacter pylori

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ctccatgacg ctgtcaaagt aaccatgggg ccaagaggca ggaatgtatt gatccaaaaa     180

agctatggcg ctccaagcat caccaaagac ggcgtgagcg tggctaaaga gattgaatta     240

agttgcccag tagctaacat gggcgctcaa ctcgttaaag aagtagcgag caaaaccgct     300

gatgctgccg gcgatggcac gaccacgcg accgtgctag cttatagcat ttttaaagaa     360

ggtttgagga atatcacggc tggggctaac cctattgaag tgaaacgagg catggataaa     420

gctgctgaag cgatcattaa tgagcttaaa aaagcgagca aaaaagtagg cggtaaagaa     480

gaaatcaccc aagtggccga catttctgca aactccgatc acaatatcgg gaaactcatc     540

gctgacgcta tggaaaaagt gggtaaagaac ggcgtgatca ccgttgagga agctaagggc     600

attgaagatg aattggatgt cgtagaaggc atgcaatttg atagaggcta cctctcccct     660
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tattttgtaa cgaacgctga gaaaatgacc gctcaattgg ataatgctta catcctttta   720

acggataaaa aaatctctag catgaaagac attctcccgc tactagaaaa aaccatgaaa   780

gagggcaaac cgcttttaat catcgctgaa gacattgagg gcgaagcttt aacgactcta   840

gtggtgaata aattaagagg cgtgttgaat atcgcagcgg ttaaagctcc aggctttggg   900

gacagaagaa aagaaatgct caaagacatc gctattttaa ccggcggtca agtcattagc   960

gaagaattgg gcttgagtct agaaaaacgct gaagtggagt ttttaggcaa agctggaagg   1020

attgtgattg acaaagacaa caccacgatc gtagatggca aaggccatag cgatgatgtt   1080

aaagacagag tcgcgcagat caaaacccaa attgcagta cgacaagcga ttatgacaaa   1140

gaaaaattgc aagaaagatt ggctaaactc tctggcggtg tggctgtgat taaagtgggc   1200

gctgcgagtg aagtggaaat gaaagagaaa aaagaccggg tggatgacgc gttgagcgcg   1260

actaaagcgg cggttgaaga aggcattgtg attggtggcg gtgcggctct cattcgcgcg   1320

gctcaaaaag tgcatttgaa tttgcacgat gatgaaaaag tgggctatga aatcatcatg   1380

cgcgcatta aagccccatt agctcaaatc gctatcaacg ctggttatga tggcggtgtg   1440

gtcgtgaatg aagtagaaaa acacgaaggg cattttggtt ttaacgctag caatggcaag   1500

tatgtggata tgtttaaaga aggcattatt gaccccttaa aagtagaaag gatcgctcta   1560

caaaatgcgg tttcggtttc aagcctgctt ttaaccacag aagccaccgt gcatgaaatc   1620

aaagaagaaa aagcgactcc ggcaatgcct gatatgggtg gcatgggcgg tatgggaggc   1680

atgggcggca tgatgtaagc ccgcttgctt tttagtataa tctgctttta aaatcccttc   1740

tctaaatccc ccctttcta aaatctcttt tttggggggg tgctttgata aaaccgctcg   1800

cttgtaaaaa catgcaacaa aaatctctg ttaagctt   1838

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<212> DNA
<213> Artificial Sequence

<220>
<223> primer oligonucleotide

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<210> 9
<211> 12
<212> PRT
<213> Helicobacter pylori

<400> 9

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1   5   10

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<210>  10
<211>  5
<212>  PRT
<213>  Helicobacter pylori

<400>  10

Glu Pro Ile Tyr Ala
1               5


<210>  11
<211>  102
<212>  DNA
<213>  Helicobacter pylori

<400>  11
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ccctttgaaa ggcatgataa agttgatgat ctcagtaagg ta                       102


<210>  12
<211>  34
<212>  PRT
<213>  Helicobacter pylori

<400>  12

Gly Arg Ser Val Ser Pro Glu Pro Ile Tyr Ala Thr Ile Asp Asp Leu
1               5                   10                  15


Gly Gly Pro Phe Pro Leu Lys Arg His Asp Lys Val Asp Asp Leu Ser
            20                  25                  30


Lys Val


<210>  13
<211>  18
<212>  DNA
<213>  Helicobacter pylori

<400>  13
cctgaaccca tttatgct                                                   18


<210>  14
<211>  6
<212>  PRT
<213>  Helicobacter pylori

<400>  14

Pro Glu Pro Ile Tyr Ala
1               5


<210>  15
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<211>  9
<212>  DNA
<213>  Helicobacter pylori

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<210>  16
<211>  3
<212>  PRT
<213>  Helicobacter pylori

<400>  16

Asp Asp Leu
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<210>  17
<211>  15
<212>  PRT
<213>  Helicobacter pylori

<400>  17

Phe Pro Leu Lys Arg His Asp Lys Val Asp Asp Leu Ser Lys Val
1               5                  10                  15


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<213>  Helicobacter pylori

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<210>  19
<211>  36
<212>  DNA
<213>  Helicobacter pylori

<400>  19
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<210>  20
<211>  15
<212>  DNA
<213>  Helicobacter pylori

<400>  20
gaacccattt atgct                                              15


<210>  21
<211>  15
<212>  DNA
<213>  Helicobacter pylori

<400>  21
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gaacccattt acgct   15

<210> 22
<211> 45
<212> DNA
<213> Helicobacter pylori

<400> 22
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<210> 23
<211> 6
<212> PRT
<213> Helicobacter pylori

<400> 23

Asn Asn Asn Asn Asn Asn
1   5

<210> 24
<211> 18
<212> DNA
<213> Helicobacter pylori

<400> 24
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<210> 25
<211> 6
<212> PRT
<213> Helicobacter pylori

<400> 25

Asn Glu Pro Ile Tyr Ala
1   5

<210> 26
<211> 6
<212> PRT
<213> Helicobacter pylori

<400> 26

Glu Glu Pro Ile Tyr Ala
1   5

<210> 27
<211> 228
<212> PRT
<213> Helicobacter pylori

<400> 27

Lys Asn Gly Lys Asn Lys Asp Phe Ser Lys Val Thr Gln Ala Lys Ser
1   5   10   15

Asp Leu Glu Asn Ser Val Lys Asp Val Ile Ile Asn Gln Lys Val Thr
        20   25   30

Asp Lys Val Asp Asn Leu Asn Gln Ala Val Ser Val Ala Lys Ala Thr
        35   40   45

Gly Asp Phe Ser Arg Val Glu Gln Ala Leu Ala Asp Leu Lys Asn Phe
    50   55   60

Ser Lys Glu Gln Leu Ala Gln Gln Ala Gln Lys Asn Glu Ser Leu Asn
65   70   75   80

Ala Arg Lys Lys Ser Glu Ile Tyr Gln Ser Val Lys Asn Gly Val Asn
                85   90   95

Gly Thr Leu Val Gly Asn Gly Leu Ser Gln Ala Glu Ala Thr Thr Leu
            100   105   110

Ser Lys Asn Phe Ser Asp Ile Lys Lys Glu Leu Asn Ala Lys Leu Gly
        115   120   125

Asn Phe Asn Asn Asn Asn Asn Asn Gly Leu Lys Asn Glu Pro Ile Tyr
    130   135   140

Ala Lys Val Asn Lys Lys Lys Ala Gly Gln Ala Ala Ser Leu Glu Glu
145   150   155   160

Pro Ile Tyr Ala Gln Val Ala Lys Lys Val Asn Ala Lys Ile Asp Arg
                165   170   175

Leu Asn Gln Ile Ala Ser Gly Leu Gly Val Val Gly Gln Ala Ala Gly
            180   185   190

Phe Pro Leu Lys Arg His Asp Lys Val Asp Asp Leu Ser Lys Val Gly
        195   200   205

Leu Ser Arg Asn Gln Glu Leu Ala Gln Lys Ile Asp Asn Leu Asn Gln
    210   215   220

Ala Val Ser Glu
225

<210> 28
<211> 685
<212> DNA
<213> Helicobacter pylori

<400> 28

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aaaaatggca aaaataagga tttcagcaag gtaacgcaag caaaaagcga ccttgaaaat      60

tccgtttaaag atgtgatcat caatcaaaag gtaacggata aagttgataa tctcaatcaa     120

gcggtatcag tggctaaagc aacgggtgat ttcagtaggg tagagcaagc gttagccgat     180

ctcaaaaatt tctcaaagga gcaattggcc caacaagctc aaaaaaatga aagtctcaat     240

gctagaaaaa aatctgaaat atatcaatcc gttaagaatg gtgtgaatgg aaccctagtc     300

ggtaatgggt tatctcaagc agaagccaca actctttcta aaaactttc ggacatcaag     360

aaagagttga atgcaaaact tggaaatttc aataacaata acaataatgg actcaaaac     420

gaacccattt atgctaaagt taataaaaag aaagcagggc aagcagctag ccttgaagaa     480

cccatttacg ctcaagttgc taaaaaggta aatgcaaaaa ttgaccgact caatcaaata     540

gcaagtggtt tgggtgttgt aagggcaagca gcgggcttcc ctttgaaaag gcatgataaa     600

gttgatgatc tcagtaaggt agggcttttca aggaatcaag aattggctca gaaaattgac     660

aatctcaatc aagcggtatc agaag                                           685
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<210> 29
<211> 699
<212> DNA
<213> Helocobacter pylori

<400> 29

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gaattcaaaa atggcaaaaa taaggatttc agcaaggtaa cgcaagcaaa aagcgacctt      60

gaaaattccg ttaaagatgt gatcatcaat caaaaggtaa cggataaagt tgataatctc     120

aatcaagcgg tatcagtggc taaagcaacg ggtgatttca gtagggtaga gcaagcgtta     180

gccgatctca aaaatttctc aaaggagcaa ttgcccaac aagctcaaaa aatgaaagt     240

ctcaatgcta gaaaaaaatc tgaaatatat caatccgtta agaatggtgt gaatggaacc     300

ctagtcggta atgggttatc tcaagcagaa gccacaactc tttctaaaaa cttttcggac     360

atcaagaaag agttgaatgc aaaacttgga aatttcaata acaataacaa taatgggactc     420

aaaaacgaac ccatttatgc taaagttaat aaaaagaaag caggggcaagc agctagcctt     480

gaagaacccca tttacgctca agttgctaaa aaggtaaatg caaaaattga ccgactcaat     540

caaatagcaa gtgggtttggg tgttgtaggg caagcagcgg gcttccctt gaaaaggcat     600

gataaagttg atgatctcag taaggtaggg cttttcagga tcaagaatt ggctcagaaa     660

attgacaatc tcaatcaagc ggtatcagaa gccgaattc                            699
```